

What is claimed is:

1. A system for optically inspecting and evaluating a sample, the system comprising:

5 a concave spherical mirror positioned to collect light reflected from a measurement spot on the sample surface; and

a convex spherical mirror positioned to receive and collimate the light collected by the concave spherical mirror with the convex and concave spherical mirrors positioned to be mutually non-obscuring.

10 2. A system as recited in claim 1 in which the concave spherical mirror is fabricated as an off-axis section of a first spherical mirror and the convex spherical mirror is fabricated as an off-axis section of a second spherical mirror with the concave and convex spherical mirrors positioned to be substantially monocentric.

15 3. A system for optically inspecting and evaluating a sample, the system comprising:

a concave spherical mirror positioned to project a probe beam onto the sample surface; and

20 a convex spherical mirror positioned to redirect the probe beam towards the concave spherical mirror, with the convex and concave spherical mirrors positioned to be mutually non-obscuring.

25 4. A system as recited in claim 3 in which the concave spherical mirror is fabricated as an off-axis section of a first spherical mirror and the convex spherical mirror is fabricated as an off-axis section of a second spherical mirror with the concave and convex spherical mirrors positioned to be substantially monocentric.

5. A system for optically inspecting and evaluating a sample, the system comprising:

5 a concave off-axis paraboloid mirror positioned to collect and to collimate light reflected from a measurement spot on the sample surface at a substantially normal angle of reflection; and

a flat mirror positioned to receive and redirect the light collected by the paraboloid mirror with the paraboloid and flat mirrors positioned to be mutually non-obscuring.

10 6. A system for optically inspecting and evaluating a sample, the system comprising:

a concave off-axis paraboloid mirror positioned to project a probe beam onto the sample surface with a substantially normal angle of incidence; and

15 a flat mirror positioned to redirect the probe beam towards the paraboloid mirror, with the paraboloid and flat mirrors positioned to be mutually non-obscuring.

7. A method of optically inspecting and evaluating a sample, the method comprising the steps of:

- 20 (a) illuminating the sample with a probe beam;
- (b) gathering a portion of the probe beam reflected by a measurement spot on the sample surface with a concave spherical mirror;
- (c) collimating light gathered by the concave spherical mirror with a convex spherical mirror with the concave and convex spherical mirrors positioned to be mutually non-obscuring; and
- 25 (d) analyzing the collimated light to evaluate the sample.

8. A method as recited in claim 7 in which the concave spherical mirror is fabricated as an off-axis section of a first spherical mirror and the convex spherical mirror is fabricated as an off-axis section of a second spherical mirror with the concave and convex
30 spherical mirrors positioned to be substantially monocentric.

9. A method of optically inspecting and evaluating a sample, the method comprising the steps of:

- (a) illuminating a convex spherical mirror with a probe beam; and
- (b) focusing the probe beam reflected by the convex spherical mirror on the sample with a concave spherical mirror, with the concave and convex spherical mirrors positioned to be mutually non-obscuring.

10. A method as recited in claim 9 in which the concave spherical mirror is fabricated as an off-axis section of a first spherical mirror and the convex spherical mirror is fabricated as an off-axis section of a second spherical mirror with the concave and convex spherical mirrors positioned to be substantially monocentric.

11. A method of optically inspecting and evaluating a sample, the method comprising the steps of:

- (a) illuminating the sample with a probe beam;
- (b) gathering and collimating a portion of the probe beam reflected by a measurement spot on the sample surface at a substantially normal angle of reflection with a concave off-axis paraboloid mirror;
- (c) redirecting light gathered by the concave off axis paraboloid mirror with a flat mirror with the paraboloid and flat mirrors positioned to be mutually non-obscuring; and
- (d) analyzing the collimated light to evaluate the sample.

12. A method of optically inspecting and evaluating a sample, the method comprising the steps of:

- (a) illuminating a flat mirror with a probe beam; and
- (b) focusing the probe beam reflected by the flat mirror on the sample at a substantially normal angle of incidence with a concave off-axis paraboloid mirror, with the paraboloid and flat mirrors positioned to be mutually non-obscuring.

13. An objective for normal incidence broadband reflectometry in which all optical components are reflective and in which there is no central obscuration.

14. An objective as recited in claim 13 that further comprises:

5 a concave spherical mirror positioned to collect light reflected from a measurement spot on the surface; and

a convex spherical mirror positioned to receive and collimate the light collected by the concave spherical mirror with the convex and concave spherical mirrors positioned to be mutually non-obscuring.

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15. An objective as recited in claim 14 in which the concave spherical mirror is fabricated as an off-axis section of a first spherical mirror and the convex spherical mirror is fabricated as an off-axis section of a second spherical mirror with the concave and convex spherical mirrors positioned to be substantially monocentric.

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16. An objective as recited in claim 13 that further comprises:

a concave off-axis paraboloid mirror positioned to collect and to collimate light reflected from a measurement spot on the surface of a sample at a substantially normal angle of reflection; and

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a flat mirror positioned to receive and redirect the light collected by the paraboloid mirror with the paraboloid and flat mirrors positioned to be mutually non-obscuring.